



# **Sustainable Design Through Process Integration: Fundamentals and Applications to Industrial Pollution Prevention, Resource Conservation, and Profitability Enhancement**

*Mahmoud M. El-Halwagi*

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This timely book provides authoritative, comprehensive, and easy-to-follow coverage of the fundamental concepts and practical techniques on the use of process integration to maximize the efficiency and sustainability of industrial processes.

Over the past three decades, significant advances have been made in treating, designing, and operating chemical processes as integrated systems. Whether you are a process engineer, an industrial decision maker, or a researcher, this book will be an indispensable resource tool for systematically enhancing process performance and developing novel and sustainable process designs. The book is also ideal for use as a text in an upper level undergraduate or an introductory graduate course on process design and sustainability.

This ground breaking reference enhances and reconciles various process and sustainability objectives, such as cost effectiveness, yield improvement, energy efficiency, and pollution prevention. The detailed tools and applications within are written by one of the world's foremost process integration and design experts and will save you time and money.

Key features:

- Allows the reader to methodically develop rigorous targets that benchmark the performance of industrial processes then develop cost-effective implementations.
- Contains state-of-the-art process integration approaches and applications including graphical, algebraic, and mathematical techniques
- Covers applications that include process economics, targeting for conservation of mass and energy, synthesis of innovative processes, retrofitting of existing systems, design and assessment of renewable energy systems, and in-process pollution prevention.
- Presents fundamentals and step-by-step procedures that can be applied to the design and optimization of new processes as well the retrofitting and operation of existing processes
- Explains how pivotal sustainability issues can holistically and methodically be addressed and reconciledIncludes numerous examples and case studies on a broad array of industrial processes and sustainable designs

About the author

Dr Mahmoud El-Halwagi is a professor and holder of the McFerrin Professorship at the Artie McFerrin Department of Chemical Engineering, Texas A&M University. He is internationally recognized for

pioneering contributions in the principles and applications of process integration and sustainable design. Dr El-Halwagi has served as a consultant to a wide variety of processing industries. He is the recipient of prestigious research and educational awards including the American Institute of Chemical Engineers Sustainable Engineering forum (AIChE SEF) Research Excellence Award, the Lockheed Martin Excellence in Engineering Teaching Award, The Fluor Distinguished Teaching Award, and the US National Science Foundation's National Young Investigator Award.

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